Filtration Patterning of Single Walled Carbon Nanotube Films
DAVID A. DALY, ZHUANGCHUN WU, ANDREW G. RINZLER, Dept. of Physics, University of Florida, Gainesville, FL — Carbon nanotubes are increasingly being explored for applications exploiting the bulk electrical conductivity of aggregate nanotubes in the form of fibers and films. Attractive in this regard are electrical conductivities orders of magnitude greater than those of conducting polymers, while retaining many of the useful features of polymers, e.g. flexibility, transparency (in thin films) and alternative device fabrication strategies. Here we describe a novel, non-lithographic patterning technique that should also be applicable to other nanomaterials. The technique is based on our method for forming thin, pure nanotube films on the surface of a filtration membrane followed by transfer of the film to the desired substrate.\textsuperscript{1} To generate patterned films we block the pores of the filtration membrane in the inverse of the ultimately desired film pattern, prior to film formation on the surface of the membrane. The nanotubes only accumulate in the membrane regions that are not occluded, resulting in the desired pattern. Blocking of the membrane pores is accomplished with use of a commercial printer. Implementation and limitations of the technique will be discussed. \textsuperscript{1} Z. Wu, Z. Chen, X. Du, J. M. Logan, J. Sippel, M. Nikolou, K. Kamaras, J. R. Reynolds, D. B. Tanner, A. F. Hebard, A. G. Rinzler, Science 305, 1273 (2004).